PATENT
P54508

CLEAN VERSION OF AMENDMENTS

IN THE CLAIMS

Please amend claims 1, and 6 through 8, to read as follows:

1 (five times amended). A redundant array of inexpensive disks (RAID) level 5 memory system, comprising:

a plurality of defect-adaptive memory devices, each of said plurality of defect-adaptive memory devices having a first region for sequentially storing parity information for data recovery and a second region for storing data;

a plurality of caches, each of said plurality of caches respectively coupled operatively to a corresponding single unique one of said plurality of defect-adaptive memory devices, each of said plurality of caches adapted for storing parity information for data recovery for a corresponding single unique one of said plurality of defect-adaptive memory devices to provide one-to-one caching; and

a controller operatively coupled to each defect-adaptive memory device of said plurality of defect-adaptive memory devices and to each corresponding single unique cache of said plurality of caches, said controller comprising a first means for selectively controlling writing and reading of parity information needed for data recovery in said first region of each corresponding single unique one of said plurality of

defect-adaptive memory devices, a second means for selectively obtaining parity information needed for data recovery from said first region of each corresponding single unique one of said plurality of defect-adaptive memory devices, and a third means for selectively storing parity information needed for data recovery obtained from said first region of a corresponding single unique one of said plurality of defect-adaptive memory devices in a predetermined corresponding single unique one of said plurality of caches.

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6 (five times amended). A redundant array of inexpensive disks (RAID) level 5 system, comprising:

a plurality of disk drives, each of said plurality of disk drives including a first region having a plurality of data blocks for storing data and a second region having a predetermined number of parity blocks for storing parity information for data recovery;

a plurality of caches, each of said plurality of caches respectively coupled operatively to a corresponding single unique one of said plurality of disk drives, each of said caches adapted for storing parity information for data recovery; and

a controller adapted to provide one-to-one caching, said controller operatively coupled to each disk drive of said plurality of disk drives and to each corresponding single

unique cache of said plurality of caches, said controller adapted for selectively controlling a write operation of data and parity information for a data recovery in each corresponding disk drive of said plurality of disk drives, said controller comprising:

a first means for selecting a single predetermined disk drive of said plurality of disk drives upon receipt of a data writing instruction from a host computer;

a second means for reading old data from the single predetermined disk drive of said plurality of disk drives;

a third means for determining whether old parity information corresponding to the old data corresponding to the single predetermined disk drive of said plurality of disk drives is accessed in a corresponding single unique cache of said plurality of caches;

a fourth means for reading the old parity information from the single predetermined disk drive of said plurality of disk drives, upon the old parity information corresponding to the single predetermined disk drive of said plurality of disk drives not being accessed in the corresponding single unique cache of said plurality of caches, and for then loading the corresponding single unique cache of said plurality

of caches with the old parity information;

a fifth means for obtaining new parity information by performing an exclusive OR operation on the old data, the old parity information and new data;

a sixth means for loading the corresponding single unique cache of said plurality of caches with the new parity information; and

a seventh means for writing the new data in said region for storing data in the single predetermined disk drive of said plurality of disk drives and writing the new parity information in said another region for storing parity information in the predetermined single disk drive of said plurality of disk drives,

whereby the data writing process is completed.

7 (amended). In a method of writing data to, and reading data from, a redundant array of inexpensive disks (RAID) level 5 system, said method comprising steps for sequentially storing information for data recovery in a first region of a disk, storing information comprising data in a second region of the disk other than the first region, controlling writing and reading of information by means of an electronic controller unit, and caching information for data recovery, *the improvement comprising* a step for

reducing overhead during a read operation for data recovery and thereby improving data input-output performance.

8 (amended). The method of claim 7, wherein said step for reducing overhead during a read operation for data recovery and thereby improving data input-output performance comprises steps for:

(a) coupling each one of a plurality of caches to each corresponding one of a plurality of disks, whereby each disk is coupled one-to-one to one cache;

(b) operatively coupling the caches to the controller;

(c) storing in each one of the plurality of caches information for data recovery in the disk corresponding to the cache; and

(d) determining information for data recovery in a disk by using information for data recovery stored in the cache corresponding to the disk.